

general run of the differences between calculation and observation, incident probably in part to a sensible excentricity, may be judged from the following results of comparison with a few of the observations made with the great refractor at Washington:—

	Pos. (c - o)	Dist. (c - o)		Pos. (c - o)	Dist. (c - o)
1874 Sept. 2	+ 0°6	+ 0°28	1877 Aug. 11	+ 0°9	+ 1°13
„ „ 26	- 2°6	- 0°54	„ Oct. 15	+ 0°5	0°00
„ Oct. 15	+ 0°2	0°00	„ „ 16	- 1°2	...
1876 Oct. 13	+ 1°2	+ 0°45	„ „ 17	+ 4°1	+ 1°86
„ „ 31	- 1°3	+ 1°33			

From the above elements we shall find for the times of greatest elongation of Mimas eastward, 1878, October 31, at 10°4h., November 1 at 9°0h., November 2 at 7°6h., and November 3 at 6°2h., and at these times, the distance of the satellite from the centre of Saturn about 30".

### GEOGRAPHICAL NOTES

ADVICES from Mr. John Carnegie, H.B.M. Consul at Loanda, of September 9 ult., give most encouraging news with respect to Mr. Heath's expedition to Angola. The young explorer had enjoyed excellent health and had just started on a six months' expedition up the River Bengo, proceeding to Galungo Alto, and, if his health permitted, returning by the Quanza River. The first small collection of birds has been received from Matamba, on the Rio Bengo, an account of which will shortly be laid before the Zoological Society by Mr. Bowdler Sharpe. As the result of a first month's collecting it is creditable, but the season of the year having been adverse, nothing of any striking interest is contained in it. More may be expected from the large case of specimens now on its way to England.

MANY attempts have been made to penetrate into the interior of Greenland from the west coast, but, until this summer, with little success. Three Danish gentlemen, Messrs. Jensen, Kornerup, and Groth, under the direction of the Commission for scientific exploration in the Danish colony, started to explore and survey the coast between Godhaab and Frederikshaab. Lieut. Jensen took advantage of the opportunity to make an excursion into the interior over the ice. The aim was to reach several mountain peaks rising out of the ice. The baggage was placed in three small sledges of the travellers' own, and the toilsome journey commenced on July 14. After two days the loose snow accumulated on the surface of the ice to such an extent that the journey became very dangerous, while they continually sank in concealed crevasses and holes, saving themselves only by adopting the Alpine expedient of attaching themselves to each other with a rope. The surface of the ice was generally undulating, but there were also many rugged parts and chasms, which rendered the journey a very difficult one. It was foggy nearly the whole time, and on July 23 a snowstorm came on. On the 24th the expedition reached the foot of the mountain referred to above. Then came on another storm which lasted for six days with continuous snow and fog; the travellers were snow blind. The weather cleared on the 31st, when the ascent of the mountain might be undertaken with some prospect of success. The height was estimated at about 5,000 feet above sea level, and on the other side of the mountain, as far as the eye could reach, ice sheets and glaciers were seen, and not the smallest speck of land free of ice. After finishing their observations the expedition returned, and reached their starting-point on August 5, having been away for twenty-three days. The mountain referred to was forty-five miles from the coast.

THE discovery of a new island in the Polar Seas is announced. E. Johannessen, who has just returned to Tromsø, reports that he penetrated a considerable dis-

tance to the east, beyond Novaya Zemlya. On September 3, in long. 66° E. and 77° 35' N. lat., he discovered an island which he has named "Ensomheden" (loneliness). It is about ten miles long, and level, the highest point not exceeding 100 feet. It was free from snow, with poor vegetation, but an immense quantity of birds. The sea was free from ice towards the west, north, and south, but drift ice was seen towards the south-east. There was evidence that the Gulf Stream touched the west coast of the island; the Stream runs in a strong current round the north coast towards the south-east. Everything about the ice was favourable for navigation so long as the vessel did not go too near the mainland of Siberia. The newly-discovered island lies, therefore, somewhat to the south-east of the region visited by the Austrian expedition of 1873-4. It has been thought probable that a line of islands in the latitude of this island extends along the north coast of Asia.

NEWS has been received from Prof. Bastian, of Berlin, that he safely arrived at Bushire, on the Persian Gulf, via Teheran and Ispahan, and that he has thence continued his journey by sea.

LIEUT. SANDEBERG, whose explorations in the Kola Peninsula and the White Sea we have already referred to, has returned to Sweden with numerous zoological collections obtained during the past summer. Lieut. Sandeberg finds the coast-waters between Varanger Fjord and the White Sea extraordinarily rich in cod and whales.

THE *Deutsche Geographische Blätter* of the Bremen Society, No. 4, contains several items of interest, some of which we note separately. There is a long and valuable paper by Prof. Struder on a visit he made to Timor in 1875, and another on the results of the numerous voyages to Siberia made this summer, all of which have been so eminently successful that a regular summer trade-route to the great Siberian rivers may now be held as established.

THE *Bulletin* of the Geographical Society of Marseilles for July-August contains an interesting account of the little-known Island of Lamoo, on the African coast, a few degrees north of Zanzibar. The island itself is described, and a pretty full account given of its inhabitants and their habits.

A TELEGRAM from Hong-Kong states that the Chinese authorities are contemplating the construction of a railway from Taku to Tientsin, in order to facilitate communication with the capital and to avoid the difficulties to navigation caused by the tortuous course of the Pei-ho. A rumour from the north in regard to this scheme was published in the *North China Herald* of Shanghai, on August 10, "with all due reservation," as it appeared almost too good to be true. Our contemporary says that the plan is believed to have been agreed upon last year, but delayed in execution because it had been hoped that the plant of the condemned Shanghai and Woosung railway could have been made partly available for the purpose. This having been otherwise disposed of, it is said to have been now determined to purchase new plant throughout, and to press forward with the new line as quickly as possible. Mr. Tong Kingsing, a well-known Cantonese merchant, frequently employed by Li Hung-chang, who is said to be the prime mover in this matter, has been at the coal-mines in the north-east of the province of Chihli for some time, but he is expected to return to Tientsin shortly, when it is believed that immediate steps will be taken concerning the new line.

THE Society of Geography of Paris held its first meeting for the year 1878-1879 on Wednesday week, in its new hotel, Boulevard St. Germain, No. 194. The number of members present exceeded 200. M. Quatrefages, president of the Section Centrale, was in the chair, and gave an address, in which he congratulated his fellow members.

on the success obtained in the building of the lofty mansion in which they were assembled, which is at a little distance from the place where the Society was founded in 1821.

In his just-published report to the Foreign Office on the trade and agriculture of French Guiana, Consul Wooldridge forwards some information of considerable interest in regard to the production of gold in that region. The quarter of Mana, hitherto unknown as a gold-producing territory, has, through the energetic endeavours of adventurers, been prospected, and is speedily being opened up; indeed, it promises to be one of the richest gold industrial quarters. The production of gold at a few hastily-established placers, in the month of March last year, gave 21,747 grammes of pure gold, and in April 39,662 grammes. It is to be feared, however, that the gold-workings here and in other parts where the precious metal is found to a large extent is having a disastrous effect on the general prosperity of the colony, for Her Majesty's Consul, quoting from the report of the Commission which periodically proceeds to the various quarters to inspect estates, draws a melancholy picture of the abandonment and poverty of agricultural property in French Guiana.

THE latest work of the leader of the Austrian North Polar Expedition, Captain Karl Weyprecht, entitled "Die Metamorphosen des Polareises," is now in course of publication at Vienna (Perles).

A CURIOUS statement appears in the foreign correspondence of the *Times*, that Russian papers state that the Amu-Darya has returned to its original bed. This may very well be the case without any or much interference on the part of man, as may be seen from Major Herbert Wood's articles on the Aral region in vols. xi. and xii. of *NATURE*. About twenty years ago the Loodon Canal at Bend, above the splitting up of the lower Amu, was dammed up. This canal seems to have been connected with the old course of the Amu into the Caspian, and a strong flood breaking down the dam might easily cause the river to resume its old course, especially as its present mouths seem to be gradually filling up with the abundant matter brought down by its waters. It is apparently at Bend that the deviation has taken place.

AN able review of Geography at the Paris Exhibition appears in the last number of the *Revue Scientifique*.

## THE TELEPHONE, ITS HISTORY AND ITS RECENT IMPROVEMENTS<sup>1</sup>

### I.

THE appearance of the two works mentioned below is indicative not only of the remarkable era of scientific invention through which we are passing, but also of the wide-spread interest in science which these inventions have aroused.

It will be noticed that neither of these works is published in England: one reaches us from America, the other from France. As a nation we are slow to appreciate the value of new inventions—a conservatism which arises less from caution than from popular ignorance of science; nor will an enlightened public opinion be possible until the first principles of science form an integral part of the education of every English boy and girl. But now that science is walking in the market-place, and holds its own on the exchange, ignorance of its elements becomes commercially perilous. A sound judgment on the value of a new scientific discovery may at any moment be indispensable to capitalists and very profit-

able to shareholders. We venture to say that such a conviction has been a prevalent idea on almost every stock exchange during the recent panic in gas shares. Scientific knowledge has presented itself in a new light: it is now a commercial article; and forthwith the British public promptly recognises its value. In fine, the business aspect of recent inventions may do more for the future extension of science teaching than years of earnest expostulation.

The two works before us cover nearly the same ground. They give the history of the invention of the telephone, the methods that have been devised for electrically transmitting and receiving speech, with the most recent improvements down to a month or two ago; they also describe the phonograph; and Prescott's book, while omitting the microphone, which is fully discussed by Du Moncel, devotes its concluding chapters to quadruplex telegraphy, electric call-bells, and electric lighting.

Of the two works Count du Moncel's is the more scientific, comprehensive, and impartial, and will add to the high reputation which its indefatigable author already possesses as the historian *par excellence* of the applications of electricity. We can therefore most heartily commend this treatise to our readers; it is, moreover, well printed, capitally illustrated, and withal published at a very low price.

Mr. Prescott's work is larger, the typography and illustrations are excellent, and in technical details and recent information it leaves nothing to be desired. The arrangement, however, is confusing. The body of the work consists almost wholly of reprints from the various papers, lectures and specifications of the workers at electric-telephony, and the absence of marks of quotation with the want of proper indication where one extract ends and another begins not only puzzles the reader but is apt to give rise to serious misapprehension. The work has obviously been hastily prepared for the press, repetitions are frequent, and the matter is arranged with little regard to the reader's convenience or to chronological sequence. Moreover, its author has an evident bias towards American inventions in general and the "Western Union Telegraph Company" in particular. It is true the work professes to deal with speaking telephones only, but as some American "tone telephones" are described in detail, we are surprised at the entire omission of the early and important telephonic experiments by Cromwell Varley in London, and afterwards by La Cour in Copenhagen.

Nevertheless, with all its defects, Mr. Prescott's book is a useful and needed contribution to scientific literature, and as each inventor is allowed to speak for himself, the careful reader is enabled to form his own judgment on certain disputed questions of priority of invention.

It is time that the history of the articulating telephone was written. Hitherto the English public have had little more to guide them on this subject than the lectures given in London by Prof. Graham Bell, lectures delivered with altogether admirable grace and diction. It is very natural that an inventor should give more prominence to his own ideas than to those of others, and hence the impression generally derived from Prof. Bell's lectures is that the sole credit of the first conception and successful construction of the articulating electric telephone is due to himself. There were, however, other workers in the field of electric-telephony besides Mr. Graham Bell, and it is to be regretted that Prof. Bell did not give sufficient prominence to this fact in his discourses. Mr. Prescott, indeed, brings some serious charges against Prof. Bell, asserting that to another American, Elisha Gray, of Chicago, is due the entire priority and merit Bell claimed for himself. Here is what Mr. Prescott says:—

"It was not till after Prof. Bell had substituted the apparatus shown in Mr. Gray's *caveat* that he was enabled

<sup>1</sup> "The Speaking Telephone, Talking Phonograph, and other Novelties," by G. B. Prescott. Illustrated. (New York: Appletons, 1878.)—"Le Téléphone, le Microphone, et le Phonographe," par Le Comte Th. du Moncel. (Hachette, 1878.)